AN ANALYSIS OF THE VARIATION IN BANKRUPTCY FILINGS ACROSS JUDICIAL DISTRICTS

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ABSTRACT

This thesis examines the causes of variation in the number of bankruptcy filings across the United States federal judicial districts. Data obtained from the 2000 US Census and the US Bankruptcy Courts are used to isolate the roles that both population size of a district and demographic risk factors play in judicial district bankruptcy filing rates. Two regressionmodeling approaches are used to accomplish this objective; the first model focuses on the effect that district population size has on the number of filings, and the second model attempts to capture the effect that risk factors have on district variation in bankruptcy filing rates. Results suggest that the majority of variation is attributed to the demographic scale of the judicial districts. However, findings also imply that financial, occupational, educational, and other non-financial household characteristics act as risk factors that induce some variation in judicial district bankruptcy rates.

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CHAPTER 1

INTRODUCTION

The concept of bankruptcy is an old one, dating back to ancient Rome, where insolvent debtors could be sold into slavery. The term bankruptcy is rooted in a Latin phrase "Banca rotta", which translates into English as "broken board". The Romans used this phrase to describe debtor default because creditors would "break the benches of defaulting merchants over their head" (Pomykala 1997).

The bankruptcy process has evolved considerably since ancient Rome. In America, bankruptcy has changed from a criminal offense to a program emphasizing financial rehabilitation. The Bankruptcy Reform Act of 1978 and revisions enacted in the Reform Act of 1994 established much of the current bankruptcy codes. These reforms, which were directed toward the objective of making the bankruptcy court system more fair and just, allow a "fresh start" for households filing bankruptcy. These reforms also relaxed bankruptcy penalties by setting higher federal exemptions for property and personal possessions and added provisions to curtail fraud (Kowalewski 2000)

Current bankruptcy law allows households to file under Chapter 7, which is full liquidation of assets, or under Chapter 13, which is reorganization of debt payments. Under Chapter 7, a debtor's nonexempt assets are liquidated and distributed to creditors.

The debtor keeps only those assets that are designated exempt by the state or federal government, and is unable to file under Chapter 7 for six years. Under Chapter 13, on the other hand, the debts of an individual with regular income are restructured. Under court supervision, the debts are reduced and/or spread out over a longer time period. If the restructuring is successful, debts will be discharged and the household will be able to retain ownership of property at the end of the rehabilitation period (Mester 2002).

Along with the evolution of bankruptcy law toward its current state, the number of households filing for bankruptcy has grown dramatically. Nationally, the number of filings has increased from 287, 570 in 1980 to 1,539,111 in 2000, a 435% increase (see Graph 1 in Appendix A). However, the growth in bankruptcy filings has not been uniform across all parts of the country. For example, in 2000, while only less than one out of every hundred households files in Alaska, almost four households out of every hundred households file in the federal Judicial District of Western Tennessee. If the bankruptcy rate[1] for the entire nation were the same as Alaska's, only 640,622 households nationally would have filed for bankruptcy in 2000. Identifying the characteristics affecting household bankruptcy rates across different regions of the country could offer insight into methods for reducing the national bankruptcy rate.

This thesis examines risk factors that can cause some federal judicial districts to have more household bankruptcy filers than others. A federal judicial district is a boundary set by Congress that contains one district court. This district court is able to hear all cases under federal jurisdiction for that district, including bankruptcy filings. The United States has ninety-four districts, with ninety of them pertaining to areas in the states of America. This study uses these ninety districts as the geographic unit for the

[1] Bankruptcy rate within this paper is defined as the number of bankruptcy filings per hundred households

analysis of risk factors. The hypothesis investigated is whether these risk factors are associated with higher or lower bankruptcy rates. This research is based on a cross-sectional analysis of bankruptcy filings and household characteristics of the ninety federal judicial districts of America in the year 2000.

The thesis is organized into five chapters including this introduction. Chapter 2 provides a review of prior literature on these risk factors. Chapter 3 explains the methodology used in this study. Results of the analysis appear in Chapter 4 along with an interpretation. Chapter 5 concludes the study and is followed by graphs in Appendix A and tables in Appendix B.

CHAPTER 2

LITERATURE REVIEW OF BANKRUPTCY RISK FACTORS

Due largely to the recent trend of rising bankruptcy rates in the United States, household bankruptcy has been studied more frequently in the past decade than in earlier years. Much of this research focuses on the abuse of bankruptcy laws and bankruptcy reform, while relatively little research has investigated the causes. Nonetheless, some of this previous research has identified risk factors apparently leading to household insolvency or high debt.

Household Financial Risk Factors

Financial characteristics of households have been closely studied for their part in the decision to file for bankruptcy. Data have shown that over the last twenty years, as bankruptcy rates have increased, savings has decreased to an almost negligible fraction of national income. According to William Gale, "The NIPA (National Income and Products Account) personal savings rate averaged 6.7% in the 1980s, 4.8% during 1990-94, fell to just 3.0% in 1996, 2.2% in 1997 and became negative in 1999 (Gale 1999).

In addition, household debt has risen to a record high. In 1970 household debt relative to disposable income was approximately 55%. By the year 2000, it had reached

85%. The debt service burden, which is the households' required debt service payment relative to their disposable income is also rising. In 1992, the household debt service burden was 11.5% and by 2001 it had grown to 16%. Dean Maki describes this debt service burden as a predictor of both credit delinquency and changes in the bankruptcy rate (Maki 2000).

Studies have found a definite link between changes in the financial circumstances of households and the rate of bankruptcy filings. Using data from 1946 to 1991, Bhandari and Weiss (1993) observe a high positive correlation between consumer debt and bankruptcy filings and a high negative correlation between income and bankruptcy filings. They concluded that "the increase in the number of bankruptcy filings is primarily due to the increased level of debt as a percentage of income. Domowitz and Sartain (1999) reached a similar conclusion in their study of the probability of filing for bankruptcy using data compiled by the US General Accounting Office on a national sampling of bankruptcies in 1980. Domowitz and Sartain find that credit card debt was the largest contributing factor to the likelihood of filing for bankruptcy.

Educational and Occupational Risk Factors

Other studies have examined risk factors relating to occupation and education. Education was a risk factor considered in Sullivan, Warren, and Westbrook's (1994) descriptive study of characteristics of bankruptcy filers in three judicial districts. They found that the population filing for bankruptcy had a lower-than-average education level. While the national proportion of people with a college degree was 21.1% in 1990, the

proportion of filers with a college degree ranged from 12.5% to 17.5% across the districts.

Sullivan, Warren, and Westbrook also found that job loss is a key factor in filing for bankruptcy. More than half of all cases they surveyed reported periods of unemployment during the two years immediately preceding a filing. They concluded that their finding on job loss "suggests a possible relationship between employment trends and the great increase in the bankruptcy rate" (Sullivan, Warren, and Westbrook 1994). Bishop reached similar results after analyzing a time series regression model of consumer bankruptcy using consumer credit and mortgage debt service burden and the national unemployment rate as predictor variables. His results indicated that unemployment, as well as debt, is a predictor of bankruptcy (Bishop 1998).

Household Demographic Risk Factors

Other studies analyze the relationship between filings and household characteristics such as gender, marital status, age, and geographic mobility. Sullivan and Warren (1999) present evidence that the number of bankruptcy filings among single women is on the rise. They observe that recent divorce is a step towards financial insolvency for many women due to inadequate earnings and unpaid support payments which leaves them with insufficient resources to pay bills and, often, to raise children.

Stavins (2000) uses regression analysis to study the high rate of credit card delinquency by analyzing the probability that credit cardholders with certain personal characteristics face delinquency. She found that recently widowed or divorced

individuals are more likely to have higher delinquency rates, while older and more educated consumers have a lower risk of delinquency.

Similarly, in descriptive work examining the risk of credit card holders, Black and Morgan (1999) noted that older borrowers were more likely to be able to pay their bills, and married homeowners were the safest borrowers for banks. Also, they concluded that payment delinquency rates were higher among households working in unskilled (blue-collar) occupations.

Another characteristic of households that has been examined is the effect of geographic mobility on the likelihood of filing. Buckley and Brinig (1998) found a positive relationship between household migration and bankruptcy, but concluded that this result was ambiguous. They offered two possible reasons for their findings, stating that, "While migration might weaken social networks and lead to increased filing rates, increased filing rates might also affect migration levels."

Judicial District Risk Factors

Researchers have also investigated the effect of risk factors that are specific to the geographic area on household filing rates. Ellis (1998) analyzed the correlation between bankruptcy rates and both automobile insurance laws and wage garnishment laws. Ellis finds a slight positive correlation between states that require automobile insurance and low bankruptcy rates. She found a higher correlation between the amount of wages exempt from garnishment laws and bankruptcy rates.

However, in her study, Ellis found no correlation between filings and the pattern of state homestead exemptions. A homestead exemption is the dollar value of a home

that a bankruptcy filer is allowed to keep when filing for Chapter 7. This can range from zero to unlimited, depending on the state. According to Kowalewski (2000), results concerning the relationship between bankruptcy rates and homestead exemptions have been conflicting. In her report to the Congressional Budget Office, Kowalewski reviewed previous studies and concluded that results do not establish a relationship between exemptions and bankruptcy filing rates.

A homestead exemption set at a high level creates an incentive to file for bankruptcy because the exempted homestead is shielded from actions of creditors. Researchers expect that high homestead exemption states would have a higher bankruptcy rate than low exemption states because the shielded asset reduces the debtor's financial loss. One possible explanation for failure of research to find a relationship between exemptions and the rate of filings may be lender's underwriting practices on loans to households. Stricter underwriting in states with high exemptions could offset any tendency for homestead exemption to increase the bankruptcy rate. A Berkowitz and White (2002) study of bankruptcy in small firms offers evidence of this effect occurring for small businesses. They found that high personal exemption levels increase the incentive for the owners of small-unincorporated firms to file for household bankruptcy. This causes the supply of credit to fall and the demand for credit to rise in states with high bankruptcy exemptions. Therefore, firms located in states with high personal exemptions are more likely to be denied credit or have loan amounts reduced. The reduced supply of credit tends to offset the incentive created by the high personal exemption.

Summary of Risk Factors

Previous research has defined a set of risk factors that lead to financial insolvency. These risk factors can be classified into four categories: financial risk factors, educational and occupational risk factors, household demographic risk factors, and risk factors specific to a judicial district.

Each of these categories includes factors that make households financially vulnerable. Financial risk factors focus on levels of income and debt in a household. Some of the financial characteristics identified as leading to bankruptcy include income, household debt, and household savings. Educational and occupational risk factors affect a household's financial solvency indirectly because they affect the source and amount of income that a household receives. Household demographic characteristics often reflect the demands on a household's financial resources. Demographic characteristics found to influence bankruptcy rates in previous studies include gender, age, marital status, and geographic mobility. Lastly, judicial district risk factors include rules that may create incentives for or against the decision to file. Those factors include automobile insurance laws, wage garnishment laws and homestead exemption.

CHAPTER 3

METHODOLOGY

This chapter describes the methodology used to test the effect of demographic risk factors on the rate of household bankruptcy filing, using data obtained from the U.S. Courts on bankruptcy filings and the U.S. Census on household characteristics. The following sections summarize bankruptcy filings, bankruptcy filers, and risk factors and describe the statistical procedures used to test the risk factors. The risk factors used in this study are listed and briefly described with data sources in Table 2.

A. Measuring Bankruptcy Filings

A petition to file for bankruptcy in the U.S. Courts, whether under Chapter 7 or Chapter 13, is a strong indicator of probable financial insolvency in a household. However, some advocates of a tighter bankruptcy code, including Members of Congress and lobbyists for credit card companies, argue that bankruptcy filings may be initiated to avoid paying bills a household actually can afford to pay. Research testing the validity of this argument has examined the income and debts of households through means testing[2].

[2] Means testing has been proposed as criteria for bankruptcy filers in the Bankruptcy Reform Bills of 1998 and 1999. Means testing estimates the amount of debt that a filer could repay over a five year period. For a debtor to be eligible for bankruptcy: (1) The filer's income must not exceed a certain percentage of median income for households with the same number of members. (2) The percentage of debt that a filer could repay in five years must not exceed a specific minimum. (3) The dollar amount of debt that a filer could repay must not exceed a set minimum. A filer who meets these requirements is considered truly financially insolvent and unable to pay.

Kowalewski (2000) evaluates these arguments in a study prepared for the Congressional Budget Office. She concludes, "If the means-testing proposals are viewed as providing practical, reasonable criteria for separating people who file for bankruptcy out of need from people who file to avoid debt repayment, then the studies' results suggest that the majority of people file out of need." Kowaleski's conclusion provides support for a household's filing for bankruptcy as a clear signal of financial distress that is likely to result in insolvency.

Data on the number of bankruptcy filings were collected from U.S. Court records. On a quarterly basis, the Administrative Office of the U.S. Courts publishes the number of Chapter 7 and 13 nonbusiness bankruptcy filings at the national, state, and judicial district level. Using these data, the total number of nonbusiness bankruptcies for the calendar years 1999 to 2001 were compiled and averaged across the 3-year period to produce an annual average for 1999-2001. Averaging tends to reduce the effect of random fluctuations from year to year, especially among districts with relatively few filings.

These data were compiled at the judicial district level, the smallest geographic unit for which data are reported, which is the level that provides the most detail for a cross-sectional analysis of bankruptcy filings in the United States. There are ninety-four judicial districts in the country with one to five in each state depending on the structure of the state's federal district court system. Because federal courts have jurisdiction over bankruptcy matters, bankruptcy cannot be filed in the state court system. Federal district court handles all filings. Using judicial districts captures the filing process with the greatest geographic detail.

These U.S. Court data cover only initial filings; no accessible data are published on completed filings (cases in which a court has entered an order). With just these initiated filings, there is no way of knowing how many households completed the bankruptcy procedure or switched between chapters of the bankruptcy code. There is also no way of knowing the characteristics of the household that filed. Consequently, total nonbusiness filings were used in all the statistical tests presented in this chapter instead of filings by specific chapter of the code. This should capture most of the households that have reached the point of financial insolvency, where household members feel they cannot repay some or all of their debts.

B. Measuring the Demographic Pool of Potential Household Filers

The 2000 U.S. Census collected information on the 115.9 million housing units in America on April 1, 2000. The data were tabulated by the Census Bureau in four separate files labeled Census Summary Files 1-4. Data from Census Summary File 3 (SF-3) are used in this study. This dataset is based on a sampling of one of every six households from all US counties. SF-3 contains detailed information on the demographic characteristics of persons and households, reported for counties and sub-county areas. Because it covers all American households, which is the entire pool of potential bankruptcy filers, SF-3 was used to identify characteristics of the population at risk of for bankruptcy.

This county-level data from SF-3 were aggregated to the judicial district level to match the geography of the bankruptcy filings data.[3] Thus, the unit of observation within

[3] In order to aggregate the Census data to the district level, all United States counties were coded to correspond with their specific district. The data was then summed to the district level using Excel.

this study is the U.S. judicial district, not the specific households at the point of insolvency. Analyzing the characteristics of a judicial district that contains a known number of household filers will address risk factors involved in household financial insolvency.

The household unit initiates any bankruptcy filings. The Census defines a household as all the people who occupy a housing unit (such as a house, apartment, mobile home, or group of rooms used as separate living quarters).

The universe of households can be broken down into two broad categories; family households and nonfamily households. Nonfamily households can be further divided into one-person households and households of two or more people living together who are not related. One-person households consist of one male or female adult living alone. They make up 25.8% of all American households. If it files for bankruptcy, a one-person household will usually generate just a single bankruptcy filing. The family household, which consists of individuals related by blood or marriage, represents 68.5% of national households. If a family household files for bankruptcy, more than one filing is possible, because one or more family businesses also may be a party to the financial insolvency. Multiple person nonfamily households could generate more than one filing, but they make up only 5.75% of national households, so their contribution to the number of filings is likely to be small.

In this study, the demographic measure used to represent the potential pool of filers is the one most highly correlated with bankruptcy filings. This unit of measurement (which could be total households, family households, one-person households, or multiple person households) most likely contains the largest proportion of potential filers. Table 1

presents correlation coefficients between number of bankruptcy filings and alternative demographic measures of the potential pool of filers. As shown in Table 1, the demographic measure most highly correlated with number of filings is the number of family households. The correlation coefficient between number of filings and number of family households is 0.9137, which shows a very strong positive association between filings and families across the nation's ninety-four judicial districts. Thus the number of family households is used in this study to measure the demographic size of judicial districts.

C. Measuring Bankruptcy Risk Factors

Risk factors reflect characteristics of households and their financial problems, as well as the characteristics of the judicial districts in which households reside. Analyzing these characteristics can shed light on the circumstances leading to a household's decision to file for bankruptcy. Many of these factors reflect financial pressures on a household to manage debt effectively. In this study, the majority of risk factors examined are based on demographic and socioeconomic data from the U.S. Census. Like data on the total number of families, data for risk factors are aggregated to the judicial-district level.

The risk factors used in this study can be classified into four groups:

(1) Financial characteristics of households

(2) Educational and occupational characteristics of the household population

(3) Other (non-financial) household characteristics

(4) Characteristics of judicial districts

Financial Characteristics. Financial characteristics address the relationship between the amount of debt a household incurs and the amount of income a household earns. Without a manageable ratio of debt to income, a household can quickly descend into financial insolvency. With respect to household income, the Census reports median household income, aggregate household income (used to compute average household income), a breakdown of the number of households in various income brackets, and household income by source for all counties and smaller geographic units. Source of income can be important because it can reflect how predictable the flow of income is for a household. For example, wage-and-salary income is usually considered more predictable than self-employment income. Wage-and-salary income has more room for growth than retirement income, which is relatively fixed.

The Census does not report total household debt, but it does report aggregate cost of mortgage financing, and the ratio of mortgage costs to household income. The cost of mortgage financing, while not the same as total household debt, is considered a good indication of a household's indebtedness because nationally, residential mortgages account for 71.9% of all household debt (Survey of Consumer Finances, 1998).

Financial characteristics considered in this study include:

- Average household income (Measures the pool of funds available to a household to service debt)
- Percentage of households with monthly mortgage costs equal to or greater than 40% of monthly income (Measures the households with extremely high financial pressure from debt)

- Percentage of households with self-employment income (Measures the households with either possibly less stable income or supplemental income to service their debt)
- Percentage of households with public assistance income (Measures the households with the financial pressure of extremely low income)
- Percentage of households with retirement income (Measures the households with the financial pressure of a fixed income)

To the extent possible with census data, these variables capture the basic financial characteristics of households with respect to the level of income, sources of income, and the amount of household debt in relation to income.

Educational and Occupational Characteristics. The level of education attained by a head of household influences career opportunities. Thus occupation and education levels are correlated. As noted in by Sullivan, Warren, and Westbrooke, a lower-than-average education level is associated with households that file for bankruptcy protection. Thus the percentage of households headed by people with education below college level is included with the risk factors in this study

Previous studies by Sullivan, Warren, and Westbrook and by Brooke show that bankruptcies are affected by unemployment rates. Thus, unemployment of households is included as a risk factor to consider.

Being employed is obviously an important factor in avoiding bankruptcy, and likewise, where an individual works may also affect a household's financial stability. For example, employees who work in retail trade and service industries (the two largest US

industries by volume of workers) may earn more income and may be more marketable during economic downturns. The same may also be true for the top two occupations by volume of workers. People employed as office/sales occupations and production occupations may be higher demand and less likely to face long periods of unemployment. Therefore, the type of industry and occupation may lower a household's risk of financial insolvency. The occupational characteristics used in this analysis include:

- Percentage of people aged 25 and over with less than a college degree (Measures amount of people with a educational background that does not enable them to demand a high income job)
- Percentage of the labor force unemployed (Measures the financial stability of the households)
- Percentage of the labor force working in the two largest industries: retail trade and services (Measures the household financial stability based on the ability of a worker to maintain a job and possibly command higher income within a high demand industry)
- Percentage of the labor force working in the two largest occupations: office/sales and production (Measures the households financial stability based on the ability of a worked to keep or find a job in times of recession within a high demand occupation)

To the extent possible with census data, these variables address employment and educational risk factors by capturing the education of the population of working age, the occupational and industrial mix of the employed labor force, and the extent to which

workers are unemployed. These factors all bear on a household's ability to earn the income needed to service household debt.

Household Characteristics. Household characteristics are the third category of risk factors. Other things being equal, the demographic make up of a family may affect their probability of filing for bankruptcy. Single-parent families, especially those headed by females may be more likely to become bankrupt due to reduced earnings and high levels of financial pressure when the family includes only one adult householder. (Sullivan and Warren 1999). Similarly, the number of children in a household may affect household financial stability because children add financial demands to a family, without increasing the income.

Age of the householder could affect bankruptcy rates because younger people hold more debt than older persons (Survey of Consumer Finances 1998). Also, households headed by younger persons may have high expenses related to recent household formation and less experience with managing those expenses, particularly debt.

Another household characteristic that may affect filing for bankruptcy is whether the household rents or owns the home in which it resides. Households that rent do not have the asset of an entire house to lose by filing as opposed to households owning a home.

Lastly, recent decisions of a household to relocate may be related to filing. As noted earlier in the literature review, Buckley and Brinig (1998) found a positive relation between migration and bankruptcy, but noted that the interpretation is ambiguous. One

possibility is that bankruptcy forces relocation. Another possibility is for the migration to cause financial stress that leads to filing.

In summary, the household characteristics used in this analysis include:

- Percentage of households headed by a single parent (Measure of high financial pressure due to single income and possible financial responsibilities of children)
- Percentage of households headed by a single mother (Measure of high financial pressure due to single income and possible financial responsibilities of children)
- Percentage of households headed by a single father (Measure of high financial pressure due to single income and possible financial responsibilities of children)
- Average number of children in a household (Measure of increased financial expenses)
- Percentage of households that rent (Measure of households that have less assets to lose by filing for bankruptcy)
- Percentage of people aged five years and over who are living in a different house than five years ago (Measure of people under financial stress due to moving, or people who have moved due to a situation such as filing for bankruptcy)
- Percentage of households headed by a householder aged 15 to 25 (Measure of ability to manage debt)

- Percentage of households headed by a householder aged 25 to 45 (Measure of ability to manage debt)
- Percentage of households headed by a householder aged 45 to 65 (Measure of ability to manage debt)
- Percentage of households headed by a householder aged 65 and over (Measure of ability to manage debt)

This group of factors is intended to capture the risk associated with the structure and living arrangements of the households, and their recent geographic mobility. The structure and living arrangements of the household plays a role in how great financial demands can become and how well the household is able to handle those demands. Household geographic mobility adds another dimension to the financial stability of households that can be examined with census data.

Characteristics of the Judicial District. The last group of risk factors includes certain characteristics of the judicial districts. Both the use of homestead exemptions and the general level of district economic activity are characteristics that may affect household bankruptcy rates.

As discussed earlier in the literature review, studies investigating the effect of state-level homestead exemptions have been unable to find evidence of an effect on the decision to file for bankruptcy. Because the data in this study have been developed differently and reflect a different time period than these other studies, a test for an effect of homestead exemptions is run to confirm or counter results in these previous studies.

Likewise, the composition of businesses in an area may reflect local bankruptcy patterns. A high percentage of small businesses may be associated with higher rates of bankruptcy, because small privately held businesses are not subject to the market discipline of a public corporation. Such businesses are not required to disclose their financial statements and could face financial troubles without their employees' full knowledge. This would negatively affect employees because they would not be forewarned of possible layoffs. Also, smaller businesses tend to be financially fragile; they often run on a smaller profit margin than large businesses and are more likely to become insolvent during adverse economic conditions. Their lack of stability during economic downturns may affect the financial solvency of the households whose members own and work for these businesses.

The legal and economic characteristics of districts considered in this study include:

- Percentage of businesses with fewer than ten employees (Measure of financial stability of local business economy)
- Percentage of businesses with fewer than twenty employees (Measure of financial stability of local business economy)

- Amount of the homestead exemption for each state[4] (Measure of household's incentive to file for bankruptcy)

All the risk factors employed in this study are described with variable name and data source in Table 2.

D. Statistical Modeling Approaches

The purpose of this analysis of bankruptcy filings is to identify variables that provide a plausible explanation for the variation in the number of household bankruptcy filings and the household filing rates among federal judicial districts. Two modeling approaches are used to accomplish this objective. First, regressions explore the extent to which filing differences among districts simply reflect differences in district size; that is, differences in the pool of potential filers or what amounts to "demographic scale." In this case, one might hypothesize that districts with many filings tend to be demographically larger districts. The results of this sort of analysis can explore the extent to which there is variation in the number of filings beyond that associated solely with demographic scale. If there is variation beyond that based on size, one might then argue that risk factors (operating independently of demographic scale) are at work. Attempting to isolate these risk factors is the goal of the second modeling approach.

These goals are reflected in two regression models employed in this study. Model A focuses on the effect that district population size has on the number of filings, while Model B attempts to capture the effect that risk factors have on district variation in bankruptcy filing rates.

[4] For purposes of regression analysis, the homestead exemption was coded as $0.001 for states with no exemption and as $800,000 for states with an unlimited exemption.

In Model A, the dependent variable is the number of bankruptcy filings in a judicial district, and the explanatory variable is the measure of population size (demographic scale) in a district, which as previously noted, is the number of families. Using this model reveals the amount of variation that can be attributed solely to the size of the district, and begins to clarify the extent to which risk factors can be expected to play an independent role in district bankruptcy filings.

Model B uses the rate of bankruptcy filings per one hundred families as the dependent variable and the risk factors described in the previous section as explanatory variables. This model captures the effect of risk factors on district filing rates. These factors include the financial, occupational, household and judicial-district characteristics previously discussed.

In the following chapter, both Models A and B will be estimated using conventional methods of linear regression to determine the extent to which observed variation in household bankruptcy patterns among federal judicial districts can be attributed to the size of districts and characteristics of the districts and their households.

CHAPTER 4

ANALYSIS AND DISCUSSION OF RESULTS

A. Model A Regression Results

Model A tests the relationship between number of filings in a judicial district and the measure of size for that district (families). The number of filings is the dependent variable and number of families is the independent variable. By isolating the effect of district size, the amount of variation in bankruptcy filings across the country attributable just to the size of the pool of potential filers can be captured.

First, to reinforce the decision to use families as the measure of size, all previously discussed measures (households, families, one-person, multiple-person) were run separately using the Model A format. The results again indicated that families were most highly correlated with bankruptcy filings. The coefficient of determination for Model A with families as the independent variable is 0.835 (Table 3). This means about 83.5% of the observed variation in bankruptcy filings across federal judicial districts can be attributed simply to differences in district size. However, further analysis revealed what appeared to be a nonlinear relationship between filings and families. The pattern of residuals from the estimated equation showed considerable heteroscedasticity[5] (Graph

[5] In econometric modeling, heteroscedasticity is the term for error variance that is not constant. This type of error variance causes more weight to be placed on observations with large error variance. In this data, it

1). To overcome this problem, Model A was reformatted using a logarithmic transformation on the variables. The problem did not reappear after the logarithmic transformation, which also reduced the effect of outliers[6] (Graph 2).

In a regression of the logarithm of number of bankruptcy filings on the logarithm of number of families, the Model A's R-squared declined to 0.833 (Table 4), meaning that number of families (size of district) explains 83.3% of the observed variation across districts in bankruptcy filings. This result indicates that there is a direct and fairly strong relationship between the number of people in an area and the number of bankruptcy filings. One possible explanation for this high correlation is the uniformity of the federal bankruptcy code across districts. Because all districts are subject to the same federal statute, which effectively controls the filing process, one might expect a possibly strong relationship between the number of filers and the size of the pool of potential filers (families). The only difference among districts, and more specifically among states, is the dollar amount of assets exempt (protected) in the filing.

If the demographic size of a district explains about 83% of the observed variation in district bankruptcy filings (Model A), then the remaining 17% must be explained by factors operating independently of demographic scale. These are the risk factors, which represent the focus of Model B.

B. Model B Regression Results

In effect, Model B examines the observed variation in district bankruptcy filings left unexplained by Model A. The dependent variable in Model B is a ratio, the number

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appears that districts of large population size have a higher error variance than those with small population size. This causes the results of the regression to be skewed towards the large district data.

[6] Outliers are data points that deviate substantially from the predicted value of the regression. Minimizing the effects of these points is important because they can increase unexplained variation.

of district bankruptcy filings per one hundred district families. The independent variables consist only of the risk factors. As previously discussed, the risk factors used in this analysis are divided into four categories:

(1) Financial characteristics of households

(2) Educational and employment characteristics of households

(3) Other (non-financial) characteristics of households

(4) Characteristics of judicial districts.

To determine which risk factors to include in Model B, the factors were first analyzed within each of the four categories shown; that is, Model B was estimated separately for each of the four sets of risk factors. To be selected for analysis, a variable's contribution to explained variation in Model B had to be statistically significant at the 5% level (or stronger). Any time a variable is added to a regression model, total explained variation will necessarily increase; the question is whether the increased variation is statistically significant. The variables with the best statistical properties in each category were then tested together in a single Model B regression.

Financial Characteristics. Within financial characteristics, the most statistically significant group of factors included the mean household income in a district (INCOME) and the percentage of households with self-employment income in a district (SELF-EMPLOY) (Table 5). Income is the most basic requirement for financial solvency, and as evident in the negative sign of the income variable, low income is a factor in increasing the risk of bankruptcy. The negative sign of the self-employment variable indicates that a higher fraction of households with self-employed income tends

to reduce the district's bankruptcy rate. This result might be explained by the fact that individuals who are self-employed and having financial difficulties are more likely to file for business bankruptcy (Chapter 13) before filing for personal bankruptcy. However, small business owners often have no way to protect their personal assets from business failure. Many times personal and business filing occur together. Therefore, an alternative explanation may be that a large portion of reported self-employment income is supplemental income to wage income. In such a case, extra income might make a household less likely to reach financial insolvency.

Interestingly, of the financial characteristics analyzed, the percentage of households with monthly mortgage costs equal to forty percent of monthly income (MORTGAGE_40) was not found to be statistically significant in the present of the significant financial variables (INCOME and SELF-EMPLOY) (Table 5). Debt is the most fundamental element of bankruptcy and its insignificance in this model is most likely explained by the characteristics of the dataset. It is difficult to determine the direct effects that debt has on a household because the Census data does not present an entire financial portfolio of the households surveyed.

Educational and Employment Characteristics. Of the occupational characteristics, two tests revealed variables that met the requirements for statistical significance. The first consists of the percentage of the labor force within a district working in the two top industries in the United States (TOP INDUSTRY) and the percentage of the labor force unemployed (UNEMPLOY) (Table 5). Unemployment has a strong positive correlation with bankruptcy filings, while the top-two industries variable

has a negative correlation. The relationship between unemployment and bankruptcy is almost self-evident, because unemployment leads to a drop in income, but not a decrease in any household debt. The strong relationship between working in a high-volume industry and not filing for bankruptcy could be due to high-volume industries having a higher, more consistent demand for workers. Therefore, an individual working in a high-volume industry may be less likely to lose his/her job during an economic downturn, and if so, may face reasonably good prospects of finding another job.

The second statistically significant result came from a model with the percentage of adults with an education below college level (EDUCATION) as the only explanatory variable (Table 5). This result shows a significant positive relationship between the filing rate for bankruptcy and having less than a college degree. As expected, not having a college degree, in general, may limit not only job opportunities, but also income potential, leading to an increase in the risk of filing for bankruptcy.

Household Characteristics. Within the group of other (non-financial) household characteristics defined as possible risk factors, two significant models were uncovered. The first includes two explanatory variables – the percentage of households with a householder aged 15-24 (AGE 15-24) and the average number of children in a household (KIDS) (Table 5). Of all households, those with younger householders were more strongly associated with bankruptcy filing. These younger households may have high financial stress because they incur many fixed costs of "home-making," while in new occupations with relatively lower income (typical of entry-level employment). Low income combined with a tendency to have more debt than older households and less

experience managing finances could explain these results. A larger number of children in the household was also positively related to higher bankruptcy filings. Children obviously cost money, and in an otherwise financially less stable household, they can be a pose a substantial financial commitment.

The second model of household characteristics uses three explanatory variables – the percentage of households run by a single mother (SINGLE MOTHER), the percentage of households that rent (RENT), and the percentage of people who have moved in the last five years (MIGRATION) (Table 5). Both MIGRATION and SINGLE_MOTHER are positively correlated with the filing rate for bankruptcy. Migration is positively related to the filing rate, possibly for one of two reasons. First, moving often imposes financial stress on households, and could be play a role in the decision to file. Conversely, the act of filing for bankruptcy could prompt a household to relocate, because of either the stigma associated with "financial failure" or a lack of funds to continue the upkeep of the household's current residence.

The positive regression coefficient for the SINGLE_MOTHER risk factor can be explained easily. In general, being a single mother can pose a great deal of financial stress. Single parenting often is the result of a divorce, and, because many women leave a marriage less able to support themselves and the children in their custody, the "new" household effectively begins under financial pressure.

The percentage of households renting, the third variable in this model, has an unexpected negative sign. Other things equal, one might expect renting to make a household more likely to file because renters tend to have fewer assets and also may have lower income. Thus, renters, with "less to lose," could be more inclined to file for

bankruptcy protection. However, the unexpected negative sign could be due to statistical problems when used in a regression equation in the presence of both SINGLE MOTHER and MIGRATION. Both of these variables are slightly correlated with RENT. Many single mother families that are the result of a recent divorce may choose to rent until more financially stable. Likewise, households moving to a new area may choose to rent until able to find a permanent home. Based on this correlation, rent is performing the same as one or both of the variables. This condition is called multicollinearity, and sign reversal is a symptom of it. However, testing and examining this statistically problem to the full extent is beyond the scope of this study.

District Characteristics. The last group, district-specific characteristics, revealed no statistically significant relationships. The business size variables (percentage of businesses with less than 10 employees, percentage of business with less than 20 employees) had no effect on the filing rate for bankruptcy (Table 5). The structure of the dataset may be responsible for this result. The data from County Business Patterns gave only the size of the business and said nothing about the financial stability of businesses in the various counties. The financial stability of businesses obviously plays a key role in the financial stability of their employees. Also, small businesses are more likely to struggle during a time of recession and not expansion. The year 2000, for which the data used in this analysis are reported, was still a time of economic growth. Therefore, the size of businesses may come into play as a cyclical factor in regressions that model change over time, but does not appear to have any influence in this cross-sectional analysis.

Homestead exemptions also did not have a significant influence on filing for bankruptcy (Table 5). As is evident from the test results, there is no correlation between high bankruptcy filing rates and the granting of homestead exemptions. As discussed in the Literature Review, one plausible explanation for this is offered by Berkowitz and White (2002). Based on their conclusions relating to small businesses, it is possible for households that lenders' underwriting practices on loans to households may offset any tendency for homestead exemptions to increase the filing rate.

Combined Characteristics. The statistically significant variables from each group of risk factors were analyzed in combination with one another in two ways. First, the variables were grouped into combined-risk-factor models. The criteria used to select these models was similar to that used previously within each category of risk factors; A variable's contribution to explained variation must be statistically significant at the 5% level (or stronger). Second, all the significant variables were placed in a single regression model to interact with one another.

Using the most statistically significant variables from each group of risk factors, two models with significant variables are constructed with occupational, financial and other (non-financial) characteristics. The first model used the percentage of adults with below-college level education (EDUCATE), the percentage of households headed by a single mother (SINGLE MOTHER), and the percentage of people who moved in the past five years (MIGRATE) (Table 5). The variables retained a positive sign, as would be expected based on results in previous tests. In addition, with an R-squared of 0.298 and

all the variables having statistical significance higher than the 1% level, this model is one of the two models that are best able to describe the causes of bankruptcy filing variation.

The second model, which also explains an large portion of bankruptcy variation, uses the percentage of the labor force working in the top two industries (TOP INDUSTRY), the percentage of households receiving self-employment income (SELF EMPLOY) and the percentage of householders aged 15-24 (AGE 15-24) (Table 5). All of the variables are statistically significant at the 1% level and higher. Also, both TOP INDUSTRY and SELF EMPLOY have retained a negative sign, and AGE 15-24 has kept a positive one. These results were expected based on the previous tests on these variables. With these risk factors, the second model has an R-squared of 0.384, meaning that, within this study, these risk factors account for the largest amount of variation.

These two results make a strong case for combining different types of risk factors into one model to explain bankruptcy filing variation. The improved R-squared and high statistical significance of the variables point towards the conclusion that financial, educational, occupational, and other (non-financial) characteristics account for the most variation in combined models. The interaction between these characteristics seems to greatly affect the bankruptcy rate.

A second way to view all the risk factors found significantly significant is to combine them in a single regression equation (Table 5). Within this equation, the only variables that remain statistically significant are percentage of workers in a high volume industry (TOP INDUSTRY) and percentage of households headed by a householder aged 15 to 24 (AGE 15- 24). While TOP INDUSTRY was significant at the 5% level, AGE 15-24 remained significant at the 1% level. Among several other variables, the

coefficient sign changed from the expected sign. SINGLE MOTHER, INCOME, KIDS, and RENTERS all have signs differed from the expected direction of the relationship. Although no further testing was done, these sign reversals most likely are the result of multicollinearity affecting different combinations of explanatory variables. Given the nature of the explanatory variables, one might expect some degree of multicollinearity in an equation combining all the key dimensions of bankruptcy risk.

C. Interpretation of the Results

The results of this study demonstrate that the variation in bankruptcy rates across the country is largely explained by the demographic size of each judicial district. However, certain types of occupational, financial, and household characteristics of the households residing in a district are significantly correlated with bankruptcy rates. Unfortunately, given the aggregate nature of census data and the data reported by the federal courts on bankruptcy filings, this analysis cannot investigate the characteristics of persons and families who actually file for bankruptcy protection. If bankruptcy filing were a question on the decennial census schedule or a representative national survey of households, along with questions on a wide range of household characteristics, then more detailed analysis of the factors affecting the decision to file would be possible.

The results in this study were obtained through cross-sectional analysis. There are advantages to comparing districts at the same point in time. The effects of general political, social and economic change are frozen in time and do not influence bankruptcy measures; however, these measures at any point in time reflect the cumulative effect of prior political, social and economic change. Further, by comparing one area of the

country with another, the effect of bankruptcy patterns of social characteristics such as family structure, occupational characteristics such as industry and education, and district characteristics such as the use of homestead exemptions, can be analyzed. However, at the same time, by studying only one year, the consistency of the results obtained for that year with past and future trends in bankruptcy filings cannot be tested. The only insight about change over time one can obtain from cross-sectional analysis is the possibility that changes across an area with respect to some variable will mimic changes over time in the same variable; this raises questions about the time-series properties of cross-sectional regression models that are beyond the scope of the current analysis. For now, given the results presented, it remains unknown whether the significant risk factors reported in this chapter would be the same factors uncovered in a time-series analysis of bankruptcy filings.

While this study only presents correlation results for certain bankruptcy risk factors among federal judicial districts, many of the factors examined in this analysis have been studied previously, using different models and techniques, in research dealing with household debt management and bankruptcy. These variables, which were discussed in the Literature Review and found to be significant in this study, include:

(1) Percentage of adults with below college level education (EDUCATION),

(2) Percentage of the labor force unemployed (UNEMPLOYMENT),

(3) Average household income in a district (INCOME),

(4) Percentage of households headed by a single mother (SINGLE MOTHER),

(5) Percentage of people who moved in the past five years (MIGRATION), and

(6) Percentage of households headed by a household aged 15-24 (AGE 15-24).

While not previously studied (according to literature reviewed for this analysis), the percentage of the labor force in the top two industries (TOP INDUSTRY), the percentage of households with self-employment income (SELF EMPLOY), the average number of kids in a household (KIDS), and the percentage of households that rent (RENT) were also found to be significantly correlated with elevated bankruptcy filing rates. While this study may not explain the relationship between the filer and these characteristics, it does provide a basis, along with other studies to date, for further empirical research.

CHAPTER 5

CONCLUSION

This study attempts to provide useful insights into the question of what brings households to the brink of financial insolvency and the decision to file for bankruptcy protection. Through use of demographic data from the 2000 Census and annual bankruptcy filings data from the U.S. Court system, a cross-sectional regression analysis of federal judicial districts was conducted to assess the relationship between bankruptcy filings, district size, and characteristics of districts and their residents.

According to the major findings of this research, population size plays the largest part (by far) in the observed variation of bankruptcy filings among judicial districts. However, risk factors do account for some of the observed variation. Specifically, household structure characteristics, occupational and educational characteristics, and financial characteristics appear to play a role in the rate at which households descend into financial insolvency.

While this study has attempted to isolate specific risk factors that put households at higher risk of bankruptcy, there is no evidence to suggest a unique set of risk factors that tell the whole story about financial insolvency for every household. Indeed, the

results presented in this study encompass many significant variables and regression models.

In the end, the basic fact of having more debt than income to service the debt causes financial insolvency, and in many cases, leads to bankruptcy. However, the factors and situations surrounding the financial problems of an individual household are numerous and diverse. Given limitations of data and methodology, a study such as this can examine some of the possibilities, perhaps plowing some new ground along the way, but it does not pretend to provide a definitive answer on the causes of high bankruptcy rates.

A more definitive answer can only be found though development and analysis of a database of profiles of personal bankruptcy filers. By collecting a broader range of demographic and financial information on each household that files for bankruptcy, a better dataset will be at hand with which to attempt more detailed and concrete answers. With the national household bankruptcy rate growing at 13.7% a year, such a dataset would certainly be valuable.

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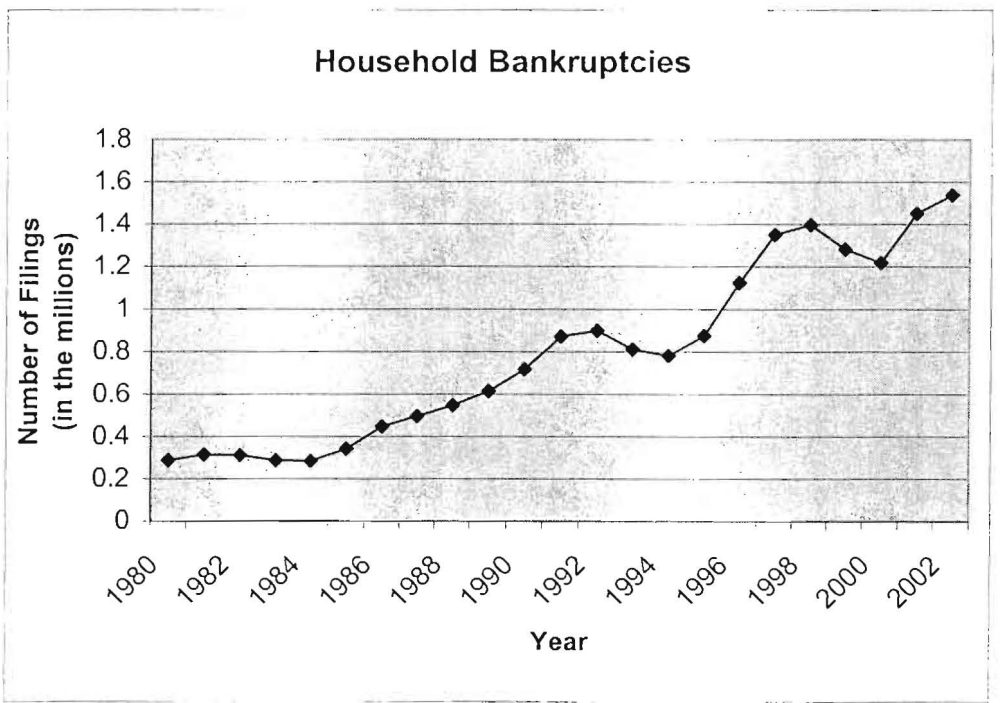
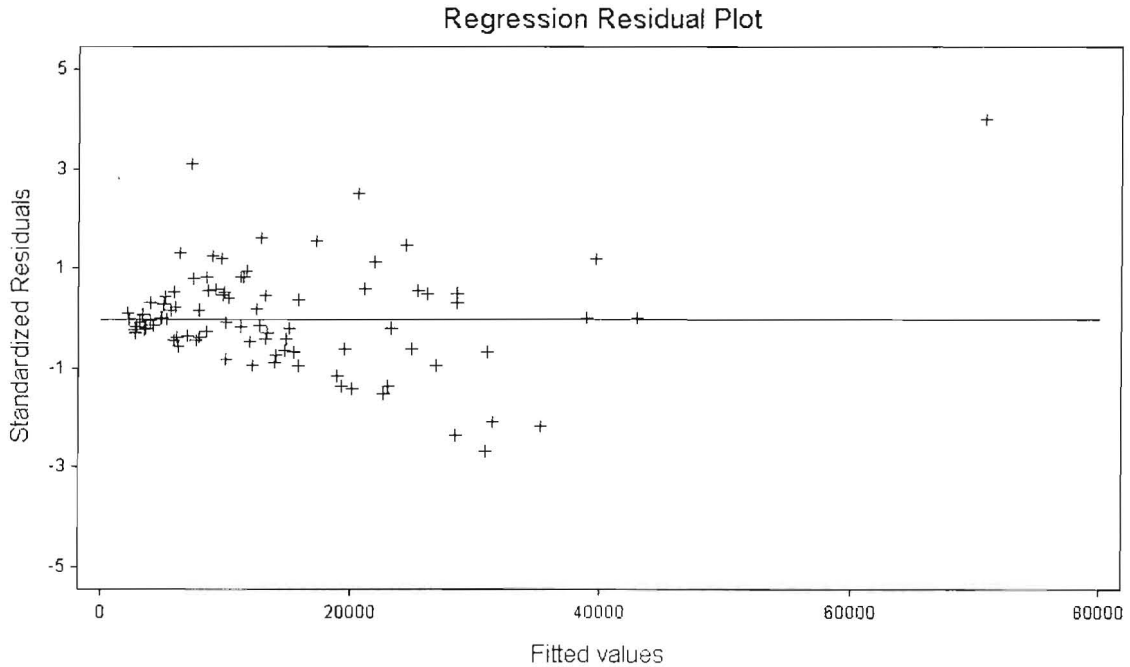
APPENDIX A

GRAPHS

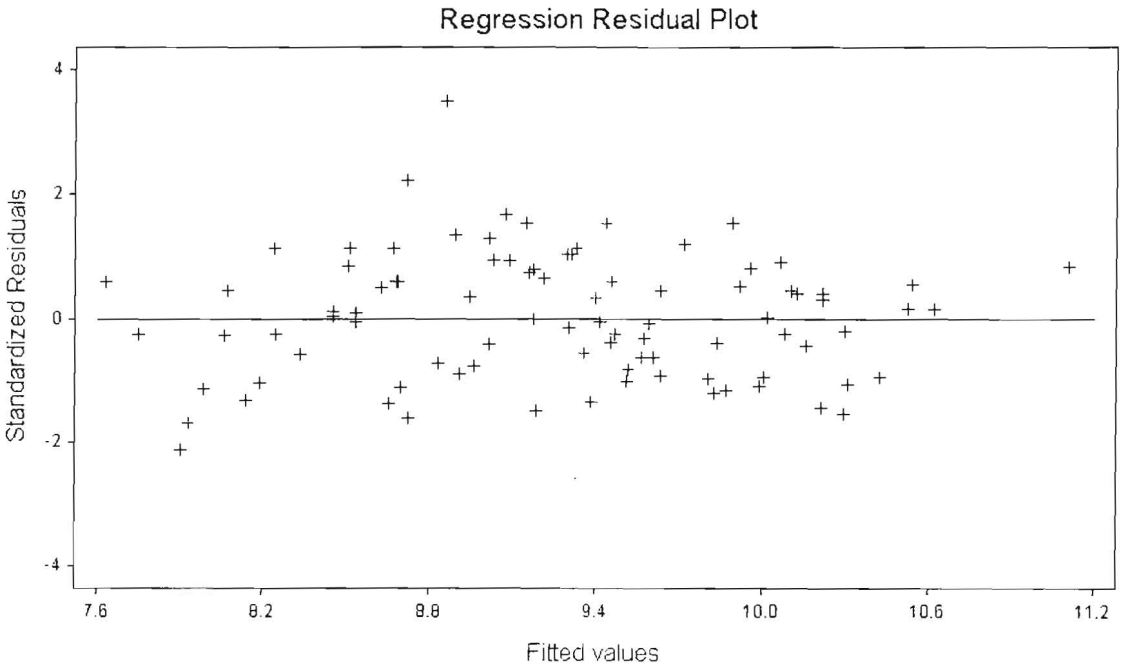
Graph 1: Household Bankruptcy Filings over Time: Years 1980-2002



Graph 2: Regression Residuals with Number of Bankruptcy Filings as Dependent Variable and Number of Families as the Predictor Variable
(US Federal Judicial Districts: 2000)



Graph 3: Regression Residuals with Log of Number of Bankruptcies as the Dependent Variables and Log of Number of Families as the Predictor Variable
(US Federal Judicial Districts: 2000)



APPENDIX B

TABLES

Table 1: Correlation Matrix between Number of Bankruptcy Filings and Alternative Demographic Measures, US Federal Judicial Districts: 2000

	Bankruptcy Filings
Households	0.9050
Families	0.9137
One-person	0.8708
Multiple-person	0.2757

NOTE: The values in this table represent Pearson product-moment correlation coefficients.

Table 2: Risk Factor Variables

Variable Name	Description	Source
INCOME	Average income	U.S. Census
MORTGAGE_40	Percent of households with monthly mortgage costs equal to or greater than 40 percent of monthly income	U.S. Census
SELF EMPLOY	Percent of households with self-employment income	U.S. Census
PUBLIC ASSIST	Percent of households with public assistance income	U.S. Census
RETIREMENT	Percent of households with retirement income	U.S. Census
EDUCATION	Percent of people aged 25 and over with less than a college degree in education	U.S. Census
UNEMPLOY	Percent of people aged 16 and over unemployed	U.S. Census
TOP INDUSTRY	Percent of people aged 16 and over working in top two industries (retail trade and services)	U.S. Census and Bureau of Labor Statistics
TOP OCCUPATION	Percent of people aged 16 and over working in top two occupations (office/sales and production)	U.S. Census and Bureau of Labor Statistics
SINGLE PARENT	Percent of households headed by a single parent	U.S. Census
SINGLE MOTHER	Percent of households headed by a single mother	U.S. Census
SINGLE FATHER	Percent of households headed by a single father	U.S. Census
KIDS	Average number of children in a household	U.S. Census
RENT	Percent of household that rent	U.S. Census
MIGRATE	Percent of people over the age of 5 who moved in the last five years	U.S. Census
AGE 15-24	Percent of households aged 15-24	U.S. Census
AGE 25-44	Percent of households aged 25-44	U.S. Census
AGE 45-64	Percent of households aged 45-64	U.S. Census
AGE OVER 65	Percent of households aged 65 and over	U.S. Census
BUSINESS_10	Percent of businesses with less than 10 employees	U.S. Census County Business Patterns
BUSINESS_20	Percent of businesses with less than 20 employees	U.S. Census County Business Patterns
HOMESTEAD	Homestead exemption for each state (no exemption = 0.001, unlimited exemption = 800,000)	Elias, Renauer, and Leonard (1998)

Table 3: Model A Results
Regression Results Using Bankruptcy Filings as the Dependent Variable

Independent Variable	Model 1	Model 2	Model 3	Model 4
Constant	30.7430	33.2528	167.727	-59517.4
	(0.03)	(0.04)	(0.16)	(-2.16)
Total households	0.01230**			
	(19.06)			
Family households		0.01796**		
		(21.08)		
One-person households			0.04726**	
			(16.62)	
Multiple-person households				23507.6**
				(2.69)
R-squared	0.8191	0.8348	0.7583	0.0760
F-statistic	398.35	444.56	276.11	7.24

NOTE: Tables 3 through 5 are set up as follows: The recorded number is the coefficient, and the number in parentheses is the t-statistic. Both the R-squared and the P-statistic are reported at the bottom of each table. "*" represents 5% significance of variable and "**" represents 1% significance of variable.

Table 4: Model A Results
Regression Results Using Logarithm of Bankruptcy Filings as the Dependent Variable

Independent Variable	Model 1	Model 2	Model 3	Model 4
Constant	-3.890	-4.265	-2.685	5.495
	(16.17)	(-6.63)	(-3.92)	(2.48)
Log of Families	0.988**			
	(20.91)			
Log of Households		0.992**		
		(20.22)		
Log of One-person Households			0.968**	
			(17.47)	
Log of Multiple-Person Households				3.296
				(1.71)
R-squared	0.835	0.823	0.776	0.032
F-statistic	438.32	409.01	305.32	2.91

Table 5: Model B Results

Regression Results Using Bankruptcy Rate per 100 Families as Dependent Variable

Independent Variable	Model 1	Model 2	Model 3	Model 4
INCOME	negligible**	negligible**		
	(-2.90)	(-3.11)		
SELF-EMPLOY	-6.323**	-5.037*		
	(-2.86)	(-2.08)		
MORTGAGE_40		3.115		
		(1.28)		
TOP INDUSTRY			-8.927**	
			(-4.99)	
UNEMPLOY			11.798**	
			(2.74)	
EDUCATE				3.912**
				(4.12)
Constant	3.750	3.229	5.196	-1.080
	(7.62)	(5.06)	(6.15)	(-1.51)
R-Squared	0.150	0.166	0.245	0.161
F-statistic	7.68	5.70	14.10	16.94

Table 5: Model B Results (Continued)
Regression Results Using Bankruptcy Rate per 100 Families as Dependent Variable

Independent Variable	Model 5	Model 6	Model 7	Model 8
AGE 15-25	37.342**			
	(5.54)			
KIDS	-2.032**			
	(-2.54)			
SINGLE MOTHER		17.567**		
		(3.36)		
RENT		-3.405**		
		(-2.64)		
MIGRATION		3.325*		
		(2.19)		
BUSINESS_10			-1.153	
			(-0.37)	
BUSINESS_20				-2.210
				(-0.52)
Constant	4.122	0.248	2.722	3.793
	(2.83)	(0.37)	(1.15)	(1.02)
R-Squared	0.282	0.1521	0.002	0.031
F-statistic	17.08	5.14	0.14	0.27

Table 5: Model B Results (Continued)
Regression Results Using Bankruptcy Rate per 100 Families as Dependent Variable

Independent Variable	Model 9	Model 10	Model 11	Model 12
HOMESTEAD	negligible (-1.93)			
SINGLE MOTHER		12.001** (2.61)		-2.513 (-0.39)
EDUCATE		4.995** (5.13)		2.926 (1.20)
MIGRATION		4.146** (3.16)		1.283 (0.80)
TOP INDUSTRY			-4.881** (-2.79)	-7.662** (-2.45)
SELF EMPLOY			-6.866** (-3.61)	-5.338 (-1.65)
AGE 15-24			29.873** (4.35)	30.47** (2.82)
KIDS				-0.566 (-0.61)
RENT				2.272 (1.25)
UNEMPLOY				2.646 (0.49)
INCOME				0.000 (1.35)
Constant	1.961 (21.00)	-4.453 (-3.98)	3.811 (4.02)	1.297 (0.33)
R-Squared	0.041	0.298	0.384	0.459
F-statistic	3.71	12.17	17.98	6.70